

P A T E N T C L A I M S

1. Structure of an electrode for use as an anode and/or a cathode in an electrolytic cell, characterised by
5 a conductive frame (10) having a number of liquid through flow openings (18) and including means (20) for connection to current a supply,
 in that one or both plane sides of the frame is covered with a conductive perforated foil or a wire mesh, and
10 the wire mesh includes spacer means (18) being adapted to cover the surface structure of the frame (10).
2. Structure of electrode according to claim 1, characterised in that both plane frame sides are covered
15 with the conductive perforated foil or a wire mesh, and the spacer means is arranged onto said foil or wire mesh net.
3. Structure of electrode according to claim 1, characterised in that the spacer means is a foil the
20 plane section of which corresponding to the plane view of the frame, for not obstructing the through flow properties of the frame, and to prevent electrical contact between the electrodes when used.
- 25 4. Structure of electrode according to claim 1, characterised in that the thicknes of the spacer means foil (16) is about 0,3 mm.
- 30 5. Structure of electrode according to claim 1 - 4, characterised in that the wire mesh includes parallel threads or a wire mesh net, and possibly the wire mesh includes parallel threads where each tenth or twentieth thread is of tantalum while the intermediate threads are of platinum.

6. Structure of electrode according to any of preceding claims, characterised in that the mesh/wires/perforated foil at the anode or cathode or both are anchored sufficient to obtain relevant conductivity between metals by friction welding, laser welding or preferably by use of pressure/heat and bonding agent to preferably both sides or one side of a framework conductor of superior conducting material added sufficient tension to the mesh/wires/perforated foil to obtain stability needed for avoiding shortcut between anode and cathode in use, and where the conductor frame itself is isolated from contact with electrolyte by means of the oxidant-resistant non-conducting material.

7. Structure of electrode according to any of preceding claims, characterised in that each individual wire or the perforated foil is attached to a frame good conducting material by use of pressure, heat and bonding agent, or induction welding or laser welding simultaneously with that wire or perforated foil is kept under sufficient tension such that electrical contact is achieved for even current distribution over exposed electrode area and exposed electrode area becomes tension stabilised to eliminate use of conventional spacer, whereupon frame or conductor is isolated from the liquid electrolyte by an oxidant-resistant isolator/coating.

8. Structure according to any of preceding claims, characterised in that the wires in each electrode when laid individually are from 100 microns to 25000 microns apart, and when they are woven, knitted, induction-welded or plaited into mesh, have an air aperture of from 15 microns to 25000 microns.

9. Structure according to any of preceding claims,
characterised in that the anode is formed of tantalum,
niobium, hafnium, zirconium, platinum, rhodium, iridium,
ruthenium, palladium or an alloy of these, or of an alloy
5 or an composition of wires of the different aforementioned
metals, or that anode is made of SS316 L steel or a higher
alloy metal.
10. Structure according to any of preceding claims,
10 characterised in that the anode is formed of a foil and is
designed to be placed in a chamber with a cathode of wire
or woven, knitted or plaited mesh, into which liquid flow
can be led on both sides of the foil and out through the
cathode mesh/cathode wires.
- 15 11. Structure according to any of preceding claims,
characterised in that both anode and cathode consist of
only plate in SS316L or higher alloy metal which is closely
perforated by photochemistry.
- 20 12. Structure according to any of preceding claims,
characterised in that the plate thickness is from 25 -
1000 microns and diameter of perforation from 25-2000
microns.
- 25 13. Structure according to any of preceding claims,
characterised in that the wires have a diameter of from
0.010 mm to 5 mm.
- 30 14. structure according to any of preceding claims,
characterised in that anode is a 0.015 mm to 0.300 mm thick
foil of tantalum, niobium, hafnium, zirconium, platinum,
rhodium, iridium, ruthenium, palladium or an alloy of these
in a chamber, where the cathode has a mesh form of wire or
35 woven, knitted, induction-welded or plaited form, and into

which liquid current can be led on both sides of foil and out through cathode foil/cathode wires.

15. Method of preparing an electrode for use as an anode
5 and/or a cathode in an electrolytic cell,
characterised by

providing a conductive frame (10) having a number of liquid through flow openings (18) and including means (20) for connection to current supply,

10 in that one or both plane sides of the frame is covered with a conductive perforated foil or a wire mesh, said foil or wire mesh being fixed to the frame by subjecting the foil or wire mesh sheet to a stretch or tension, and then
15 being forced against and fixed to the frame surface by means of a welding and/or adhesive operation.

16. Method according to claim 15, characterised in that
a spacer means is arranged onto said foil or wire mesh
20 net said spacer means (18) being a foil the plane section of which corresponding to the plane view of the frame, for not obstructing the through flow properties of the frame in use.

17. Method according to claims 15-16, characterised in
25 that the spacer foil is a PVC or polypropylene sheet and is welded to the frame/conductive wire mesh.

18. Method according to claims 15-17, characterised in
that applying a spacer means foil (16) of a thickness of
30 about 0,3 mm.

19. Use of the electrode structure according preceding claims in an electrolytic cell where one single anode electrode and a cathode electrode are stacked and

interconnected in numbers from one anode and up to 50 altogether.

20. Use of electrode structure according to claim 19 in an electrolytic cell processing liquids/water where the anode and cathode is of identical material or different, and in case of similar material, a direct current DC power applied might be alternated to avoid scaling and uneven tear and wear.

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21. Use of electrode structure according to claim 19-20, in an electrolytic cell processing liquids/water in that the flow capacity might be from a few litres /hr and up to to more than 1000 m³/hr.

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22. Use of electrode structure according to claims 19-21 in an electrolytic cell processing liquids/water in that a typical current density at 316L anodes is 38 mA/cm² provided a Cl content at 5 ppm, and for noble metals the current is 270 Amp at a anode area of 0,5 cm².

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23. Use of anode and cathode according to the preceding claims 19-22, in an electrolytic cell, for production of oxidants through electrolysis, for oxidation of organic material in liquids, and organic material on particles in liquids.

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24. Use of anode and cathode according to the preceding claims 19-23, in an electrolytic cell, for production of oxidants through electrolysis, for oxidation and destruction of bacteria, spores, micro-organisms, algae and virus in liquids.

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25. Use of anode and cathode according to the preceding claims 19-24, in an electrolytic cell, for production of

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oxidants through electrolysis, for treatment of fresh water and drinking water.

26. Use of anode and cathode according to the preceding
5 claims 19-25, in an electrolytic cell, in which polluted liquid/water is processed through light aperture in anode and/or cathode.

27. Use of anode and cathode according to the preceding
10 claims 19-26, in an electrolytic cell, for production of oxidants through electrolysis, for destruction of virus, spores and bacteria, and microorganisms, algae and algal cysts smaller than 100 microns in ballast water from ships.

15 28. Use of anode and cathode according to the preceding claims 19-27, where the liquid that is being treated, before it is treated according to the invention, is directed through a mechanical particle extractor in order to remove all particles and organisms larger than light
20 aperture in the electrode.

29. Use of the anode and cathode according to the preceeding claims 19-28, where the liquid that has been treated, after it is treated according to the invention, is
25 directed through an hydrophobic adsorption filter or hydrophobic adsorption media in order to remove potential excess organic compounds.

30. Use of the anode and cathode according to the
30 preceeding claims 19-29, where the liquid while treated is directed through a flotation device in order to remove electro flotated organic material.